The Journal

OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS

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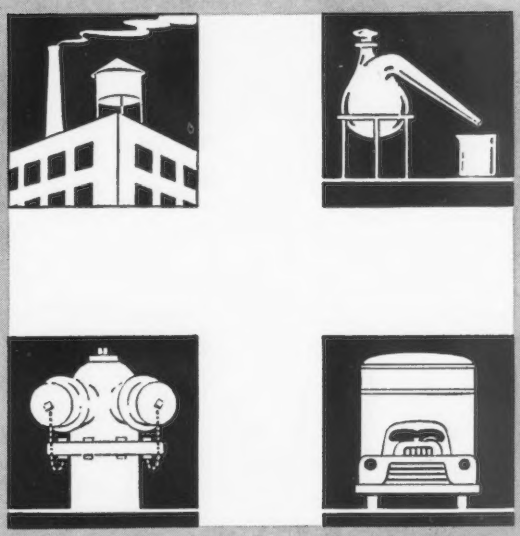

MAY, 1960

Volume V Number 2

Authors, Committee Consider Scope of Safety Profession

■ IN THE FIVE YEARS since the *Journal* was launched, a number of its authors have discussed the basic nature of accident prevention work and have asked for a careful reappraisal of the definition and appropriateness of the term, "safety engineering," in light of the requirements of the profession in the modern industrial world.

In this issue Author C. Russell DeReamer (page 21) expresses his viewpoint on the Society's need for a firm decision on the question of "safety engineer" versus "safety specialist"—and the reevaluation of Society objectives which might result from such a decision—in the light of industry's rapid technological progress and the new areas of knowledge which this progress demands of the safety profession.

At the recent President's Conference on Occupational Safety, which carried the theme, "The Challenge of Safety in a Changing World," this matter of scientific advancement received much attention. Still another aspect affecting future industrial safety work is "The Changing Nature of the Work Force," topic of a conference address by Ewan Clague, commissioner of labor statistics, which has been adapted for publication as a *Journal* article (page 18).

These papers by the Messrs. DeReamer and Clague appear at an especially appropriate time since their subject matter covers a part of the material presently being considered by the Society's Special Committee on Long Range Planning which, under the chairmanship of Past President Henry B. Duffus, is preparing recommendations to spell out the scope of the safety profession and the goals of the Society. —Editor

AMERICAN SOCIETY OF SAFETY ENGINEERS

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OUR PRESIDENT SPEAKS ON SAFETY

LEADERSHIP IN SAFETY by the American Society of Safety Engineers was illustrated once again at the recent President's Conference on Occupational Safety. As a Society, we can be justifiably proud of the part our members played in making this year's conference one of the most effective to date.

A review of the roster of the Planning Committee for the conference reveals that a majority of its members belong to our Society. Our managing director was chairman of the Program Committee and a substantial number of the speakers and consultants in both the plenary sessions and the workshops are on our membership rolls. This is solid evidence of the important professional contribution our Society members are making in the safety field.

The theme of the conference was an exciting one: "The Challenge of Safety in a Changing World." It set the pattern for the forward thinking and positive action which must be taken by professional safety people in the years to come. Highlighted by the dramatic changes which are occurring in our scientific and industrial community and the marked increase in the number of young people who will be coming into our work force in the next decade, the conference pointed up the need for education—not only education of our working force but education of our safety people in the changing nature of their responsibilities.

The challenge to us professionally was most aptly put by Eugene J. Lyons, special assistant to the President for personnel management, at a March 2 joint meeting of our Society's Washington Chapter and the Federal Safety Council. Mr. Lyons said, in part:

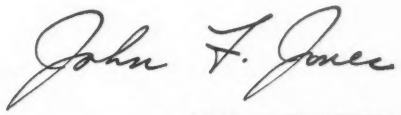
"Right now the safety profession should be giving serious thought to the impact new processes, new products, new sources of power and the changing pattern of the mobility of people will have in terms of engineering, enforcement and educational programs. . . If it can be assumed that the (Society) embodies the majority of the professional safety personnel, then I raise two pertinent questions: 'Is this enough to provide the needed manpower of professional safety skills to meet the needs of the predicted expanding economy?' And second, 'What measures are your national professional Society taking to upgrade the skills of your present membership to meet the new safety problems you will be expected to handle?'

"I say this because some years ago business and industry assumed that any individual who had perpetual enthusiasm, was a reasonably good promoter and got along with his associates in the line operating organization, was qualified to direct a safety program. I do not need to tell you that this is no longer the case. It will be even less the case in the decade ahead with mechanization and automation assuming rapidly increasing importance.

"Technical and professional training are becoming more and more essential to the safety director. . . Training personnel to work safely in a completely new environment is no task for an amateur. . . Not enough effort is being directed toward encouraging young people to enter into the safety profession and not enough universities and colleges are integrating safety into professional curriculums. . .

"(Future success) will be largely determined by your efforts to orient management to the need and value of employing safety professionals—as well as providing for in-service professional development to upgrade present safety skills—and to convince other professional groups that they have a fundamental responsibility to engineer and design safety considerations as an integral part of their professional specialty. . .

"I hope I can leave one thought with you. Lift your sights. It is imperative that you develop a new dedication, a new enthusiasm for your profession. Make realistic plans for providing better qualified personnel in adequate numbers to meet the pressing needs of the future. And be sure that you personally are keeping pace with the changing world—for the challenge *of* safety is a challenge *to* the safety engineer."



JOHN F. JONES, PRESIDENT
AMERICAN SOCIETY OF SAFETY ENGINEERS

The Changing Nature of the Work Force

BY EWAN CLAGUE

Author Ewan Claque was one of the opening speakers March 1, 1960, at the President's Conference on Occupational Safety in Washington, D.C. Mr. Clague's speech was, of course, keyed to the overall conference theme, "The Challenge of Safety in a Changing World," and carried the same title as the article presented here, which has been especially adapted from the speech.

Ewan Clague is commissioner of labor statistics, U.S. Department of Labor, a position he has held since 1946 except for one year (1954-55) when he served as special assistant to Secretary of Labor James P. Mitchell. He also is a former professor of research and statistics, University of Pennsylvania.

As has been pointed out a number of times, all of us can expect that the decade of the 1960's will bring vast changes—both in our private lives and in our occupational activities. These changes will have a particularly heavy impact upon the occupational safety movement. Those of us who have responsibilities in the field (and who does not?) will have to face new problems and conditions.

Our whole approach to occupational safety may have to be changed. If we fail to anticipate the new problems that are going to confront us and fail to orient our accident prevention activities to the new circumstances and conditions under which we shall be working, we may fail in our objectives. It behooves all of us, therefore, to look closely at the probable pattern of change during the 1960's and to start planning our safety activities accordingly.

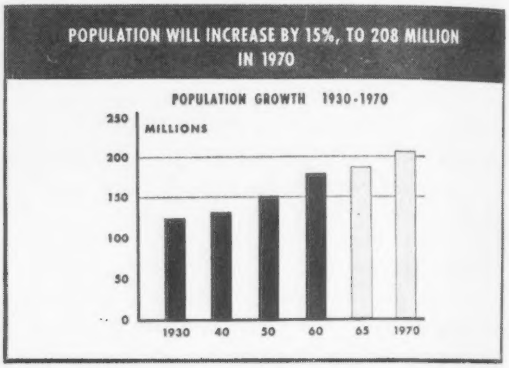


Figure 1—To orient our thinking, we first should look at the probable changes in our total population. It appears that the rapid population growth of the 1950's will continue through the 1960's. Total population is expected to rise from 180 to 208 million—or by 15 per cent over the decade. At the same time, the age distribution of our population will change. We shall have many more older persons and young people.

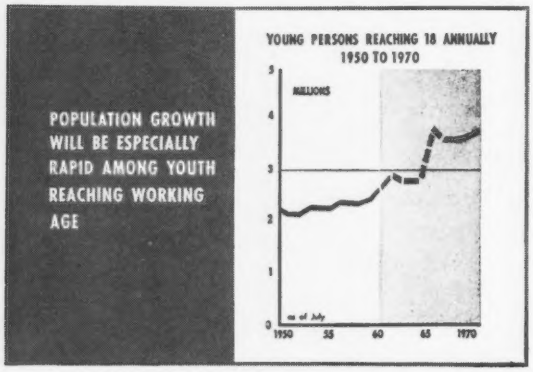


Figure 2—The number of young persons reaching 18 years of age will increase rapidly—from 2.6 million per year in 1960 to 3.8 million per year in 1970. This large growth in the number of young people reflects the sharp rise in birth rates during and immediately following World War II. The 18-21 age group—from which our young workers come—will expand from less than 10 million in 1960 to nearly 15 million in 1970.

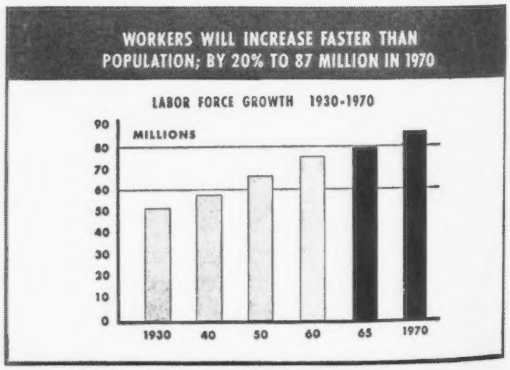


Figure 3—Turning now to the labor force with which occupational safety is directly associated, we find that this group will grow from 73.6 million in 1960 to 87.1 in 1970. The increase in this period will be by far the largest in any decade of our history. The growing number of young people and the increasing participation of women, particularly of those over 35, will be the two principal factors in this expansion.

Probably we all have heard and read discussions concerning what we may expect to see in the way of new work processes and changes in the work environment. The problems arising from these changes alone will tax the abilities of all of us in the safety movement. But these problems do not stand alone. Safety is not simply a matter of working conditions. Safety is concerned with people and we in the safety movement must always take into account the people with whom we work—both in terms of their number and their characteristics.

The ten charts which accompany this article (Figures 1 through 10) outline some of the changes we expect in this area—changes which I am sure will create problems in the field of safety. These charts highlight the Department of Labor's recently completed analysis of the labor force changes expected in the decade of the 1960's.

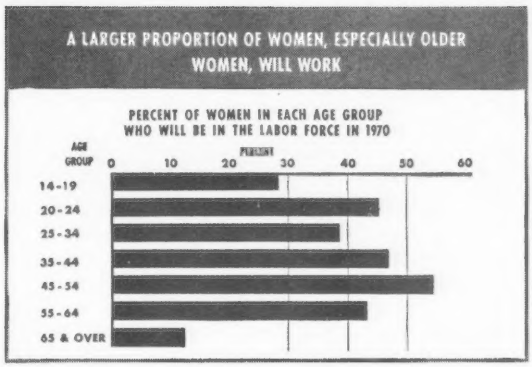


Figure 5—Concerning the increase in the labor force which is anticipated during the next decade, approximately 3 million of the additional workers will be women who are more than 45 years of age. By 1970, nearly one-half of all women aged 35 to 64 will be in the labor force. Many of these women either will not have had any previous work experience or at least will not have been in the labor force for some years.

YOUNG WORKERS WILL ACCOUNT FOR MAJOR SHARE OF CHANGES IN WORKING POPULATION

THERE WILL BE:	1960 (MILLIONS)	1970 (MILLIONS)	CHANGE 1960 TO 1970 NUMBERS (MILLIONS)	CHANGE 1960 TO 1970 PERCENT
MANY MORE YOUNG WORKERS UNDER 25	13.8	20.2	6.4	46
A RELATIVELY SMALL INCREASE AMONG WORKERS 25-34	15.3	17.1	1.8	12
ACTUALLY FEWER WORKERS AGE 35-44	16.6	16.4	-.2	-1
LARGER NUMBERS OF OLDER WORKERS	27.9	33.4	5.5	20

Figure 4—Changes in age distribution of the labor force will be striking and significant. Workers under 25 and workers 45 and over will account for almost 90 per cent of the total increase. The 25-34 age group will show only a small expansion. The 35-44 age group will decline, particularly in terms of male workers—important because this age group normally supplies a large proportion of executives, managers, foremen and highly skilled workers.

The statistics presented in the charts, and the trends they indicate, have many implications for the safety movement. If injury frequency rates hold at about their present levels throughout the decade, we can expect the volume of work injuries to rise in proportion to the increase in employment. Starting with this assumption but taking into account the variation in employment increase anticipated in the different classifications of industry, it appears that we could have some 340,000 more disabling work injuries in 1970 than we had in 1959.

But past experience indicates that in every period of expanding employment, injuries have tended to rise faster than employment. We have current evidence of this in the record for 1959. If this tendency continues, our crude estimate of a 340,000 increase in the annual total of disabling injuries by 1970 probably is much too low. Obviously, the objective of the safety movement during the next ten years must be to eliminate and, if possible, to reverse this upward tendency.

We cannot say positively what creates this tendency for injuries to rise faster than employement. There is persuasive evidence, however, to support a conclusion that we build our safety programs too thin. At best, they are designed to cope with current

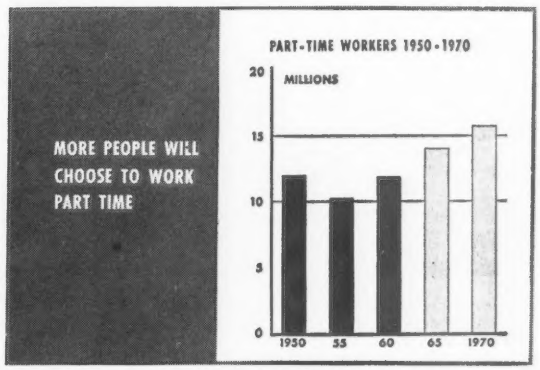


Figure 6—Another expected development is a large increase in part time workers, who should number about 16 million in 1970—a rise of more than 30 per cent from 1960. Many will be young people who also will be attending school. Others will be women who will divide their time between work and homemaking. Significantly, members of this group frequently move in and out of the labor force and tend to shift from one job to another.

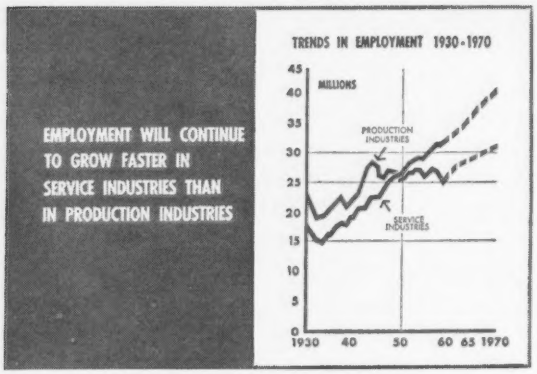


Figure 7—Since 1950, the number of workers in the service industries has been greater than the number employed in the production industries and the differential has been constantly widening. This tendency is expected to continue through the 1960's and, by 1970, about 57 per cent of all workers will be in service industries. Employment in the service industries is expected to rise more than 25 per cent; in the production industries, about 14 per cent.

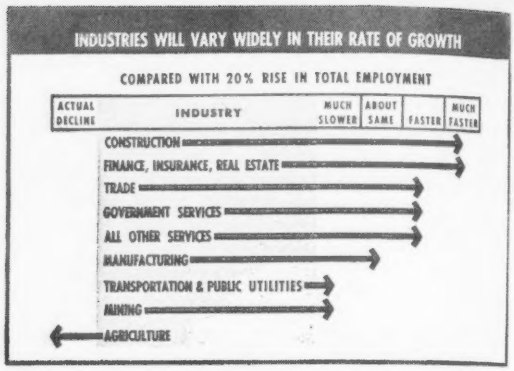


Figure 8—Although expansion is expected in nearly all industries, the rate in terms of employment will vary widely. Considering broad categories, a very high growth rate is seen for construction, finance, insurance and real estate; above average for trade, government and other services. Employment in manufacturing will grow about as fast as total employment, with only small gains in transportation, public utilities and mining. Agriculture will show a decline.

problems and rarely have reserve resources to meet changing conditions. The buildup of these resources seems to come only after the unfavorable effects of changing conditions have become apparent.

In our past experience, we find evidence that extensive shifting of regular workers tends to force injury rates up, just as does the introduction of large numbers of new persons into the work force. We also know that industries which have a high ratio of casual or part time employment tend to have higher injury rates than those which have stable employment.

All of these factors appear in the employment outlook for the 1960's. These influences we can identify and evaluate with some degree of assurance. Less definitely, perhaps, we can say that the rising proportion of young people and women in the labor force may require revamping our accident prevention procedures. Certainly, it is indicated that we must expand our safety activities in construction and in the service industries. And we may have to develop new techniques to insure the safety of the rapidly growing group of professional and technical workers.

Figure 9—When we look inside the broad industry classifications for more detailed information on the changing characteristics of employment, we find a rapidly changing occupational pattern. In broad categories, the so-called "white collar" group of occupations is growing rapidly. The "blue collar" occupations are growing at a slower rate but employment in the agricultural occupations is declining. These trends are expected to continue through 1970.

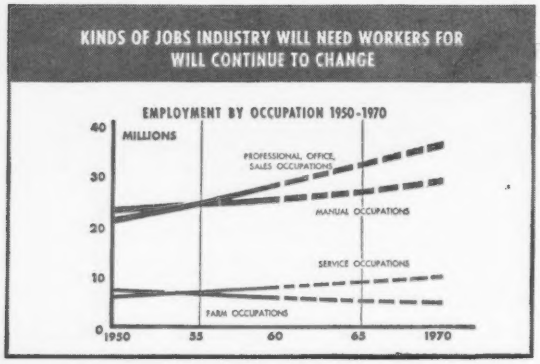
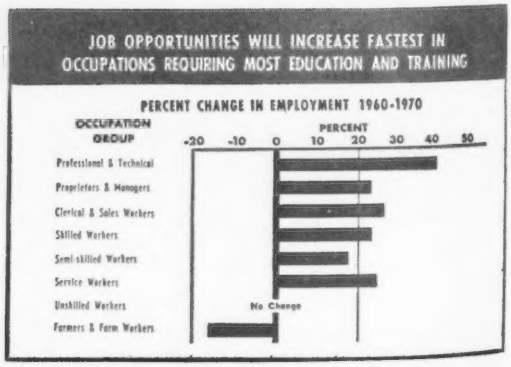


Figure 10—Greatest proportionate growth in employment will be in professional and technical occupations. Clerical, sales and managerial occupations will grow faster than the average. In manual occupations outside agriculture, the most rapid rise is expected among the skilled workers, with less rapid increase in semiskilled workers, a reflection of growing automation. For unskilled workers, employment is expected to hold fairly constant at the present level.



C. Russell DeReamer, safety manager for International Business Machines, for many years was associated with General Electric, where he entered safety work in 1940. A Purdue graduate, he joined the Society in 1944 and is a member of the Metropolitan Chapter. He is author of the book, *Modern Safety Practices.*

BY C. RUSSELL DE REAMER

our Society must prepare TODAY *for* TOMORROW

THE AMERICAN SOCIETY OF SAFETY ENGINEERS, in an effort to maintain a sound, dynamic and progressive organization, must focus more attention on goals and objectives. Like planning a trip—our Society must decide where it wants to go and how it plans to get there.

Once clear, well defined goals and objectives are agreed upon, Society members—and in particular our Executive Committee—will be able to act with initiative, confidence and in harmony with a majority of the membership. We will have answers to these questions:

- Should the Society remain exclusively identified by title and objective with *engineering?*
- Should the Society encompass the broad field of safety or confine its activities mainly to industrial safety?
- Should the present Society organizational structure be retained or is a reorganization required to better achieve our goals?

At the moment our Society is embroiled in a lively debate: "Should we remain an engineering society or become a safety society?" This question has been identified as our main problem but it is only a symptom. With industrial organizational structures in a state of flux, with new management methods and concepts being introduced on every hand, with new technologies and new materials being put to use, the primary problem of our Society is connected with change. The 1950's saw the era of change begin. The pace will be quickened through the sixties. Can our Society, as it presently is structured and administered, meet the safety challenges of the next decade? Are we preparing for change or are we allowing the glorious past to be our guide? This is the issue.

NEW TECHNOLOGY DEMANDS NEW METHODS

These are some of the changes ahead. Technological developments will be more intricate, more complicated and more scientific than during the last two decades. Equipment design, processes and sys-

tems usually will involve several fields of engineering, chemistry and physics. Hence the safety specialist will have an increasingly difficult task to keep up to date on the many advances and changes which will mark the coming years. He will find new areas in his own field in which he must be informed and an ever mounting mass of safety information which he must digest.

This being the case, it is likely that the safety specialist also can remain informed and knowledgeable in the various fields of engineering? Obviously with the rapid technological advancements predicted and the broadening scope of the safety job, it would be a Herculean task to keep abreast of both safety and engineering areas.

Therefore, in our look ahead it might serve the best interests of our Society to bring the safety elements of the safety job into much sharper focus. Safety personnel, by concentrating on safety and leaving the engineering for the engineers, would create a better opportunity to gain greater skill and competence in the field of safety. As a matter of fact, considering the breadth and depth of the engineering disciplines, it would be prudent for safety specialists to avoid making "engineering" decisions even if qualified to make them. By concentrating on the safety elements of the safety job, the overall effectiveness of safety personnel would be increased, more safety principles and techniques would be developed and the professional status of safety personnel would be enhanced. Becoming expert in the field of safety would be the goal.

"SAFETY EXPERT" CAN WIN PRO STANDING

It should take no great stretch of imagination to visualize that this "safety expert" approach is no different from the situation which exists when the engineer or the manager seeks the advice and counsel of the medical director or the company counsel. When either the manager or the engineer goes to the medical director, he wants medical advice; when he goes to the legal counsel he wants advice on some legal problem. He recognizes the doctor and the lawyer as experts in their respective fields. He anticipates receiving advice based on either a medical or legal discipline—*not* medical-engineering or legal-engineering. Likewise, safety personnel must strive for recognition as professional safety experts. When the engineer goes to the safety specialist, he should expect professional safety advice and he should recognize the safety specialist to be more competent than himself to give such advice.

In determining the objectives and the course that will serve the best interests of our Society, it would be wise to ask: "Should we advance the arts and sciences of safety or the arts and sciences of engineering? Which course is more likely to provide the professional status we seek?"

Of course, it is not denied that an engineering degree does provide an excellent background for some safety jobs. Nevertheless, in establishing our goals and objectives it would appear appropriate to place more emphasis on the development and refinement of safety principles and philosophies than on the promotion of the arts and sciences of engineering. If our Society should continue to embrace the engineering viewpoint, are not the odds pretty high that the end result would be neither good engineering nor good safety?

LEADERS IN SAFETY GIVE VIEWS

Several leaders in the safety field have given this safety versus engineering problem much thought. In the November, 1955, issue of *National Safety News,* H. W. Heinrich, an illustrious pioneer in safety, asks: "Can Safety Stand on Its Own Feet?" He states:

> "Accident prevention encompasses knowledge, thought and action on a broader scale than other professions. Is its future to be tied up wholly with engineering or can it become a distinct and recognized profession? Neither medicine nor law dilutes its professional name by addition of any other profession and for the society which serves it so well high time to take stock of values and objectives to decide now whether it is best for the safety profession and for the society which serves it so well to identify itself even more closely with engineering —the safety profession might find itself admitted within the engineering group but on its fringes."

Arthur Christian, corporate safety director for American Viscose Company and vice president of the Society's Eastern Region, makes this succinct observation:

> "It is my feeling that the so-called 'engineering approach' to safety, as we know it now, is but one phase of evolution. Possibly we could call it a battle won. Today safety is included in the engineering of most new products—it has to be. We have yet to win the war and that is why I think we must broaden our sights to make safety really a profession."

Obviously many of our members believe the Society more likely would attain status and recognition as an independent organization devoted to safety than it would as an engineering society. The Society might consider facing this challenge of creating its own image rather than creating an image which is the reflection of another society.

SOCIETY RECORD JUSTIFIES LONE STAND

In deciding upon objectives for the future, we must face facts. Our Society has reached a point in its progress where there no longer is any need for timidity regarding its status among leading societies. The Society does have a record of achievement and growth that justifies the creation of its own image. Safety principles and philosophies have been established and tested. Safety personnel have risen to positions of distinction in many organizations. The educational, psychological, management and engineering aspects have been identified and usually are considered of equal importance. Why not build on these strengths?

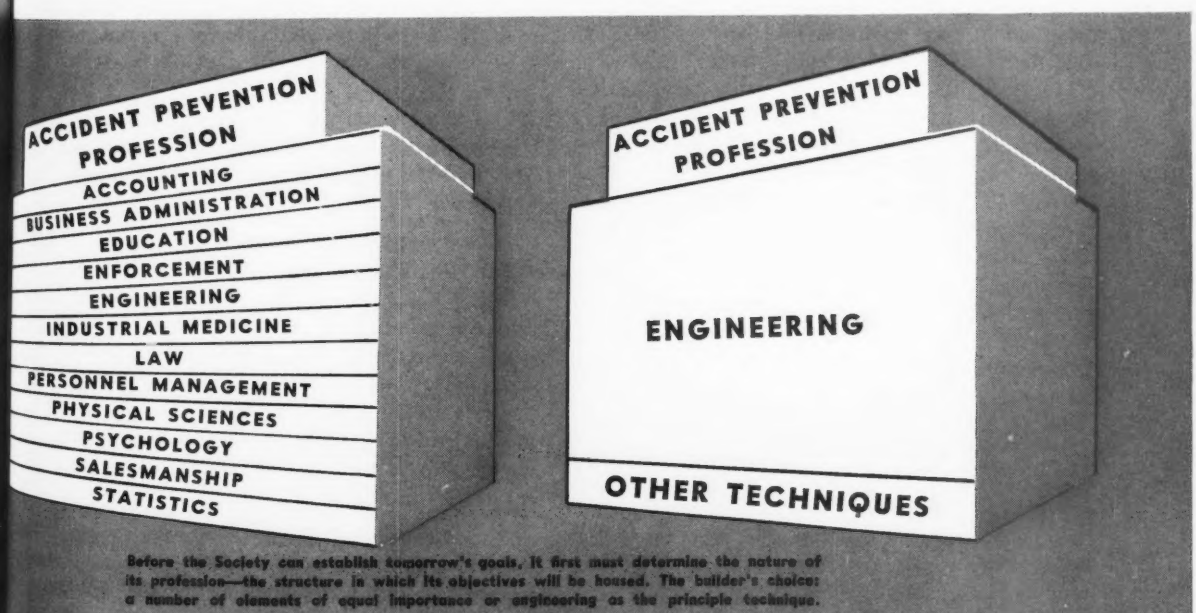
Of course, those who believe our principal objective should be "to promote the arts and sciences connected with engineering in its relation to accident prevention and the conservation of life and property" have the impact of history to support their views.

EARLY EMPHASIS ON ENGINEERING

In the early years of the safety movement the emphasis was on engineering. For many years our Society was the Engineering Section of the National Safety Council. The title, "safety engineer," was widely used and, as our Executive Committee points out, our objectives are closely related to those of the founder engineering societies. But history, coupled with the human characteristic to resist change, can be misleading. In the establishment of objectives the *facts* as they exist today—and those changes which we can predict—must be our guide. These are the facts:

- A large percentage of Society members are not engineers.
- About 80 per cent of all safety specialists report to personnel, less than 2 per cent report to engineering.
- Not a single "safety engineering" book has been written in the long history of industrial safety.
- Few employers require their safety personnel to have engineering degrees.
- A review of the job descriptions of many safety managers and safety directors reveals few and in most cases no engineering duties.
- The title, "safety engineer," is being used much less by industry; titles such as "safety manager" or "safety director" apparently are preferred.
- The Society is not presently recognized as an engineering society by engineering groups, by the Joint Engineering Council or by employers.
- The term, "safety engineering," lacks a clear definition—it could be either mechanical, electrical or chemical engineering, or perhaps all three.

By not reaching an agreement regarding the nature of the safety job, are we not confusing management and failing to obtain the recognition the safety function so richly deserves? On one hand, we say it is an "engineering" function but, on the other hand, the facts tend to say it is not. Perhaps the problem is one of confusing the use of practical engineering



Before the Society can establish tomorrow's goals, it first must determine the nature of its profession—the structure in which its objectives will be housed. The builder's choice: a number of elements of equal importance or engineering as the principle technique.

knowledge in safety work with the actual practice of engineering.

Dr. Walter A. Cutter, director of the Center for Safety Education, New York University, and Thomas H. Wilkenson, director of safety, Department of Army, in their paper, "Toward the Profession of Safety Program Management" (*National Safety News*, October, 1959), ask three pertinent questions:

1. How much true engineering is practiced by the average specialist in accident prevention?
2. How much engineering, and for what purposes, is required by employers?
3. How many of the established elements of today's practice are engineering in nature?

Answers to these questions undoubtedly will vary by individual. But on one point there should be no compromise. Our Society, in deciding on its future course, should strive to become an engineering society with objectives fully in accord with an engineering concept *or* it should strive to become a safety society with objectives fully in accord with a safety concept. We can't take a middle road and hope for any degree of success.

WHAT IS NATURE OF SAFETY JOB TODAY?

Those who speak of safety as a profession usually are speaking in terms of the overall effectiveness of safety personnel and the potential that might be reached if the right objectives are established. In deciding where the Society is going, it would be appropriate to take a careful look at the safety job. Is it the same job that it was 20 years ago or even 10 years ago? Is the same type person being selected for the job or have the requirements changed? Is the average safety assignment now short term, long term or terminal?

In viewing this aspect of the problem we must make sure that personal involvements or our own safety experiences do not distort our point of view. We must have the courage and the integrity to recognize change and then make the most of it. We must accept a concept and a framework for the safety job of the future which might be much different from that of the past but, nevertheless, much more attractive and acceptable to management.

A plea is being made to examine and recast present Society objectives carefully in the light of the dynamic changes that have taken place and can be anticipated in the next decade. John Juli, safety manager of the Consolidated Western Steel Div., U. S. Steel Corporation, and a past national president of our Society, sums up the plea in an "Our President Speaks on Safety" column (in the August, 1958, *Journal*) as follows:

> "Our relatively young profession is growing rapidly toward maturity; the moment of decision has arrived when we must determine the character of that maturity. We must define, clearly and accurately, the areas of knowledge and standards of performance which give us a legitimate claim, before management and the world, as specialists of professional standing. And first of all, we must reach agreement on the basic nature of our work."

PROFESSIONAL MUST BELIEVE IN HIMSELF

There are many who believe fervently that our members can stand before management and the world as "safety" specialists of professional status. But to do this we must believe in ourselves and help make our Society great by thinking greatly of our role as safety specialists. Instead of trying to prove who is right or wrong regarding the argument of engineering versus a safety specialty, it would be better to join forces and establish sound objectives for a growing Society. Those who favor the engineering concept have much to support their case. Likewise, those who favor the safety concept have much to support their case.

The important point is that we must select objectives and a future course that will serve the best interests of our Society. We must decide where we want to go; then we can decide how we want to get there. But in doing this we cannot overlook change.

FUTURE SPECIALIST TO BE ADVISER

In the past the industrial safety specialist has been the doer. In the future he will be the catalyst, the adviser, the teacher who precipitates safety action on the part of line managers. This is true because management has been conditioned to think in terms of safety as a line manager's responsibility. This puts the safety job in a new and an exciting perspective.

In the past the safety specialist was concerned mainly with in-plant safety. But the growing understanding and appreciation by management of the importance of accident prevention encompassing the whole environment of industry—the plant and the community—will change greatly the position and the role of the safety specialist. He will need to have a broader outlook, a greater understanding of management principles and improved skills in the art of persuasion and motivation.

It is these changes taken all together which will constitute the big challenge and opportunity facing members of the American Society of Safety Engineers as we prepare today for tomorrow.

The ACCIDENT PREVENTION COMMITTEE of the EDISON ELECTRIC INSTITUTE

BY ARTHUR J. NAQUIN

THE ACCIDENT PREVENTION COMMITTEE of the Edison Electric Institute was organized in 1934 and held its first meeting in Cleveland, Ohio, on October 3 of that same year. At first, only two meetings were held per year, each of two days duration. In 1940, three meetings were scheduled for the year and this practice continued until 1956, when the sessions were increased from two to three days each in order to return to a semiannual series of assemblies—an arrangement brought about by the ever increasing number of national, regional, state and local safety organizations which bid for the time and capabilities of professional electric public utility safety engineers.

Looking first at the parent body, the objectives of the Edison Electric Institute are stated as follows:

1. The advancement in the public service of the art of producing, transmitting and distributing electricity and the promotion of scientific research in such field.
2. The ascertainment and making available to the members and the public of factual information, data and statistics relating to the electric industry.
3. To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with *safe* and adequate service, giving due regard to the interests of consumer, investor and employe.

In a similar vein, the purpose for which the EEI Accident Prevention Committee was organized was "to provide safety leadership and know-how to member companies and the electric utility industry at large."

The activities of the committee are constantly increasing as new tools, new methods, new forms of equipment and new techniques have developed within the industry. For example, the generation of electricity in atomic fired power plants has created a good many new accident prevention problems. The basic activities of the committee have been summarized as follows:

1. To study accidents in the electric utility industry to determine the causes of death or injury to members of the industry and the general public.
2. To compile and publish adequate statistics concerning such injuries or fatalities.
3. To exchange ideas concerning techniques and practices that will safeguard employes and the general public.
4. To prepare visual and/or educational training aids.
5. To prepare safety equipment specifications.
6. To encourage research and training in first aid and artificial respiration.
7. To provide suitable recognition for outstanding safety performance.

At the present time, the EEI Accident Prevention Committee is composed of safety representatives of 72 operating companies, three service organizations, an EEI staff secretary, and three associates who are specialists in the respective fields of visual aids, ventricular fibrillation and general organized safety (National Safety Council). The committee also has available the services of a Medical Task Force of eight members and an Atomic Plant Safety Task Force of seven members. The operating company

Arthur J. Naquin, currently chairman of EEI's Accident Prevention Committee, is safety counselor for New Orleans Public Service Inc., with which he has been associated for 34 years. A graduate engineer (Tulane), he joined our Society in 1942, is a charter member and past officer of the New Orleans Chapter.

Meeting of the EEI Accident Prevention Committee in Atlantic City, New Jersey, November 9-11, 1959.

eei accident prevention committee *continued*

members come from companies operating in every state in the Union except Alaska, Maine, Montana, Nebraska, Tennessee and Wyoming. Usually, some 40 manufacturers' representatives attend the semi-annual meetings and participate in the discussions of those subcommittees with which they are most concerned.

The work of the Accident Prevention Committee is carried on by an Advisory Council and 23 subcommittees. Liaison also is maintained with 14 other groups such as the American Institute of Electrical Engineers, the American Standards Association and the National Safety Council. The titles of the subcommittees and a brief statement of their activities are as follows:

Accident Exchange—publishes four times per year a 40 page summary of some 20 to 25 typical accidents which have resulted in death or serious injury. The names of the employes or their companies are not given. The known facts concerning each injury are summarized and usually are accompanied by photographs or diagrams. Recommendations for the prevention of similar injuries are given. About 5,000 copies are distributed each year.

Accident Rates and Fatalities—publishes annually a "Review and Classification of Fatal Accidents within the Electric Light and Power Industry." This summary tells the grim story of each victim's job classification, voltage involved if electric shock or burn was involved, path of current and just what the victim was doing. Some 23,000 copies of this publication are placed in the hands of industry foremen and supervisors each year and the subject matter is widely used in "tail board" conferences.

The above subcommittee and EEI staff also publish annually a report entitled, "Accident Experience of the Electric Light and Power Industry." The employe injury record of both privately managed and government managed electric utilities is given. All companies are identified only by a code number.

Aerial Basket Equipment—is formulating a set of recommended safe operating practices for this relatively new form of automotive equipment which enables a lineman to manipulate an insulated basket platform to convenient working position among energized conductors.

Atomic Plant Safety—with the assistance of its associate Task Force, is endeavoring to standardize the method of recording cumulative exposure to radiation in atomic fired power plants and to prepare a bibliography of publications on basic safety problems relating to nuclear power plants.

Climbing Equipment—stresses the causes of linemen's cutouts (fall from poles) and how they can be prevented. It is preparing a new publication combining the best features of two older publications, "Linemen's Cutouts" and "Use and Care of Linemen's Climbers." It deals with the care and use of linemen's body belts and safety straps.

Electric Shock and Burn—publishes annually a report concerning all known cases of injury due to electric flash or burn, including nondisabling injuries.

Electric Shock Prevention—is concentrating on the most prevalent cause of fatalities in the industry. It is coordinating the efforts being made by a number of the subcommittees to "Stop Shock." It is formulating a long range program aimed at preventing employes from accidentally coming in contact with energized equipment or conductors.

Fireman Safety—is helping to expedite the republication of the excellent booklet published by the University of Michigan entitled, "The Fireman and Electrical Equipment." In this booklet, procedures are set forth to insure that firemen will not be accidentally electrocuted while engaged in extinguishing fires.

Governmental Activities—is a "watchdog" subcommittee whose function is to examine all proposed governmental regulations which, in the name of safety, may impose undue hardship on the electrical industry or all industry.

Grounding Practices—is working with the Transmission and Distribution Committee of EEI to codify the best known and accepted practices for grounding circuits and equipment protectively.

Management Relations—is a liaison between executive, administrative and supervisory management and the professional electric utility accident prevention engineer. Management is ever willing to participate in the vital job of preventing employe injuries but often needs advice and suggestions as to how such participation can be made most effective.

Monthly Safety Package—is a group that has undertaken the task of providing the electric utility industry with a monthly "package" consisting of a safety poster, a leaflet and a crew leader's letter—a service available for purchase each year from EEI.

Motor Vehicle Safety—is a comparatively new subcommittee which assembles data annually on the number of motor vehicle accidents experienced by the industry, where they happen (while backing, making left turn, etc.) and the accident rate per 100,000 miles of operation. The average rate of 1.78 experienced in 1958 by 53 reporting companies which operate 564,004,051 miles is, admittedly, a rate that needs to be lowered.

Nonemploye Overhead Line Contacts—is cooperating with the National Safety Council in the development of posters, stickers and other printed materials designed to tell the general public how to avoid accidental contact with energized overhead conductors while operating cranes, pile drivers, hay derricks, model airplanes, etc. . . or just flying a kite.

Protective Equipment—periodically compiles industry practices concerning the use of rubber protective equipment such as gloves, sleeves, line hose, blankets, hoods, and the use of insulated hard hats and portable insulated platforms. It has liaison representatives on the ASA J6 Committee. It is planning to revise the excellent booklet, "The Application and Care of Rubber Protective Equipment."

Publicity—cooperates with technical journals of the electric utility industry by supplying them with articles, reports and photographs dealing with employe injury prevention. It studies all ads of manufacturers in the technical press and, diplomatically, calls attention to those instances where linemen and other employes are shown improperly attired or working in obviously unsafe positions.

Question Box—is the industry's clearing house for questions relating to safety practices or equipment. Approximately 200 "round table" questions are submitted in writing each six months by members of

EMPLOYE INJURY RATES *(from the National Safety Council's "Accident Facts")*

YEAR	FREQUENCY		SEVERITY		NUMBER EEI APC MEMBERS
	AVERAGE FOR 40 INDUSTRIES	ELECTRIC UTILITY INDUSTRY	AVERAGE FOR 40 INDUSTRIES	ELECTRIC UTILITY INDUSTRY	
1947	13.26	15.96	1230	2390	36
1948	11.49	15.20	1120	2110	36
1949	10.14	14.02	1020	2370	37
1950	9.30	11.96	940	1960	37
1951	9.06	11.06	970	2000	38
1952	8.40	11.06	880	1660	47
1953	7.44	9.43	830	1560	49
1954	7.22	8.62	800	1520	50
1955	6.96	7.62	815	1519	56
1956	6.38	6.84	733	1384	61
1957	6.27	6.39	740	1382	58
1958	6.17	6.39	744	1065	65
1959					75

the Accident Prevention Committee and the composite answers are discussed as much as time will permit at the semiannual meetings.

Resuscitation—deals not only with the techniques of administering artificial repiration but is sponsoring a professional study at Johns Hopkins University on the causes of ventricular fibrillation and the development of field equipment that will restore heart action in victims of electric shock. The subcommittee recently prepared a "Resuscitation Manual" which states that the mouth-to-mouth method is considered preferable to all other techniques. Over 15,000 copies were promptly sold and the booklet is now in its second printing.

Safeguarding Energized Work Areas—is restudying the matter of how to best safeguard employes who are working around indoor and outdoor substations and other similar installations. In 1958 it published a report entitled, "Injuries in Substations —1957."

Safety Awards—is examining those bases on which superior safety performance might be acknowledged and rewarded. At the present time, the industry presents Certificates of Safety Achievement to companies and divisions or units thereof which work 1,000,000 or more manhours without a disabling injury. About 150 of the Safety Achievement Award Certificates are presented annually. The subcommittee is endeavoring to design a suitable emblem and phrase an appropriate slogan relative to the work of the Accident Prevention Committee.

Safety Devices, Materials and Methods—displays at the semiannual meetings the latest safety devices and materials that have been brought to the subcommittee's attention. Much of the material exhibited was designed and produced by operating companies.

Visual Aids—is continuously engaged in producing or helping to produce motion pictures and sound slide films which deal with specific industry safety subjects. It also keeps the general committee informed as to what EEI member companies have produced such as the film, "Electric Power and Common Sense," which was produced by six New England electric companies, and "Take Another Look," which was produced by the Commonwealth Edison Company of Chicago.

Uniform Safe Work Practices—is engaged in the monumental task of preparing a manual of recommended safe working practices that are accepted and used throughout the entire electric utility industry. Already, most of the 14 sections of the proposed manual have been written and redrafted from three to five times. When completed, it will fill a long-felt need of the industry.

What, you may very well ask, has all this committee work accomplished for the industry? At first, the work of the committee had very little effect in the industry, for all too few electric utility companies were represented on the Accident Prevention Committee, apparently only 18 at first.

From 1934 to 1947, the committee increased to 36 members and, in the meantime, the industry's frequency rate rose from 8.98 in 1934 to 15.96 in 1947. During this same period, severity averaged 2130 per year with no great fluctuation. In contrast, the frequency rate for all industry dropped from 15.29 in 1934 to 13.26 in 1947. Apparently, the EEI Accident Prevention Committee was fighting a losing battle due, no doubt, to the electric utility industry's very rapid growth.

Since 1947, the accident rate trend for the industry has reversed and has continued to decrease until, in 1958, the electric utility industry's frequency rate of 6.39 was just below the 6.17 average rate for all industry. A study of the table, "Employe Injury Rates," will show what has been accomplished during the last 12 years.

As may be expected, active committee work brings its own reward. A study of the 1958 injury rates of those companies which are represented on the EEI Accident Prevention Committee shows that the average frequency rate for the 71 operating companies was slightly less than half of what it was for those companies not represented on the committee—0.98 disabling injuries per 100 employes versus 1.97. The number of days lost per employe was 1.87 for represented companies versus 2.76 for those who were not represented. A fatality occurred for every 5,198 employes of the first group, whereas those companies not represented on the committee experienced one fatality for every 3,310 employes.

It shall be the endeavor of those who direct the activities of the EEI Accident Prevention Committee to increase the size of its membership at a reasonable rate, to keep abreast of the safety problems of the industry and to bring the benefit of the activities of the committee to the entire electric public utility industry and to industry as a whole.

The research work that is being carried on concerning defibrillation is just one example of accident prevention work that will benefit all industry. The EEI Accident Prevention Committee stands ready to cooperate as best it can on all projects aimed at safeguarding the industrial workers of America and the general public.

James B. Black has been safety officer for the National Institutes of Health for 10 years and has been in safety work some 20 years. A graduate mechanical engineer (Northwestern), he joined the Society in 1947 and is a member-at-large. He also is a member of NSC's Chemical Section Executive Committee.

In "Impact Test on Glass," by C. A. Pippin of the Dow Chemical Company (Journal, *August, 1958*), *data were presented on impact strengths of various types of protective glass. A table from that article is reprinted below, with summary of procedure used (see Table I). In reply, Author Black points out that Dow's tests were concluded with a blunt object type blow and that impact from explosion produces different results.*

. . . more about

IMPACT TESTS ON GLASS

BY JAMES B. BLACK

TESTS TO DETERMINE the safest type of glass for a typical chemical exhaust hood showed impact resistances of the various glasses in almost reverse proportion to the data (Table I) of the Dow tests. Since some wrong, general conclusions may be drawn, although the data in Table I are not in question, results of another type of impact test are presented here. Two items indicate the direction of this comparison: Table I indicates that wire glass has a somewhat higher average impact strength than laminated glass (see Figures 2 and 4).

TABLE I—Test, Cost and Impact Strength Data

Tests reported in the August, 1958, Journal *used this procedure: an 18 x 24 inch piece of the glass under test was framed in wood and rested on a one inch pad of foam rubber. A felt-covered ball weighing 6.685 pounds was dropped from increasing heights until the glass failed.*

	Average Impact Strength Pounds-Inches	Approxmate Cost per Square Foot
Double strength (1/8 in.)	25	$ .55
Laminated (1/4 in.)	110	.80
Plate glass (1/4 in.)	110	1.25
Wired glass (1/4 in.)	112	1.02
Allyl ester plastic (1/4 in.)	555	4.62
Tempered glass (1/4 in.)	582	2.60
Acrylic resin plastic (1/4 in.)	1,086	1.49

Photographic comparison shows how tempered glass fractures into cubical or rectangular fragments or groups of such particles still adhering to each other, while wired glass fractures and slivers and its wiring also fails.

Compare also the items tempered glass and laminated glass in Table I with the data of Figures 3 and 4. Although tempered glass has an extremely high impact strength against a certain type of blow such as from a blunt object, it has considerably less impact resistance than laminated glass against a sharp object.

The photographs that follow were made by a remotely controlled high speed movie camera (3000 frames per second) set at approximately 165 degrees from the plane of the glass surface. Tests were conducted April 4, 1952, at the Naval Ordnance Laboratory.

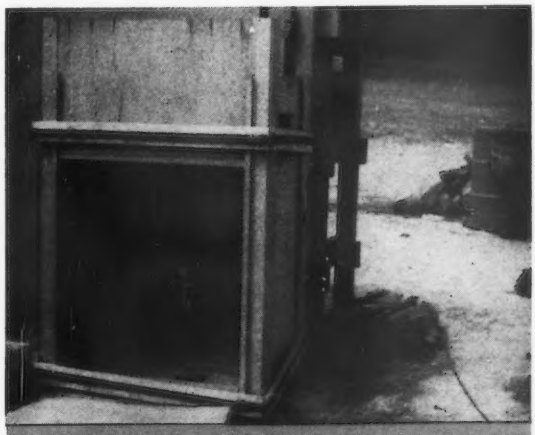


Figure 1. The explosive charge, in a 1000 ml. erlenmeyer flask, was centered at a height of nine inches in a model of a chemical exhaust hood. The bottom of the glass sash was secured partly open. The top was not framed. The sides were in sheet metal guides.

FIGURE 2

Figure 2. One gram of tetryl detonated against a 3 x 3 foot section of ¼ inch wire glass blew a few fine slivers of glass five or six feet from the hood. Most of the wires in the crack from the top were broken; some of the wires in the the lower vertical crack were broken. This glass could not have withstood additional impact. The white specks in the maximum impact area are particles of the exploded flask.

Figure 3. Explosion of 1 gram of tetryl against the same size and thickness of tempered glass blew out the whole section. The largest portion dropped immediately in front of the hood and other pieces landed up to eight feet away, a few as far as 30 feet away. The glass crackled for several minutes after the explosion, indicating that disintegration was still in progress. Most of the particles were small, but several 15 to 20 square inch pieces were blown two to four feet from the hood.

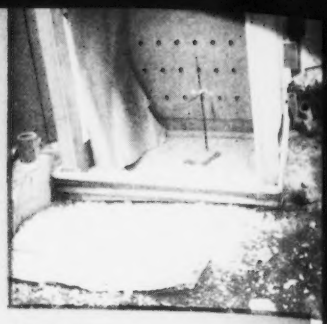


FIGURE 3

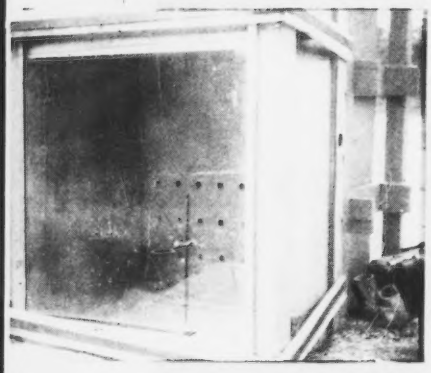


FIGURE 4

Figure 4. In the test against ¼ inch laminated safety glass, no flying slivers could be observed. The outside surface felt smooth; it was difficult to detect cracks. The glass could have withstood considerably more impact.

Figure 5. Two grams of tetryl were exploded against a new piece of ¼ inch laminated safety glass. The glass was intact after the explosion but could be wobbled, its vertical axis held mostly by the plastic lamination. It could have withstood a slight increase in impact. The glass felt smooth and appeared not to have slivered.

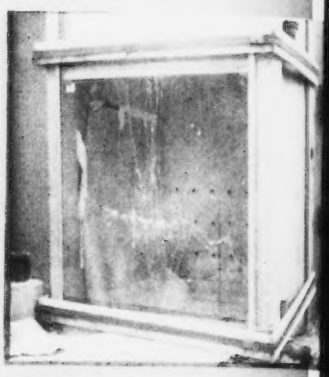


FIGURE 5

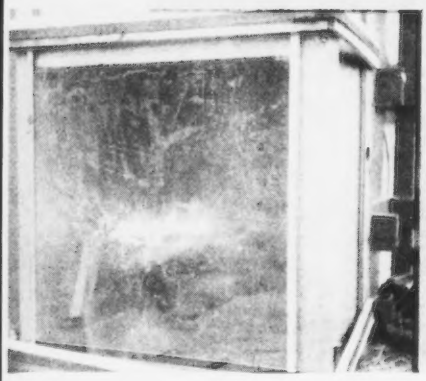


FIGURE 6

Figure 6. Two grams of explosive were used against ¼ inch acrylic resin plastic sheet (Plexiglas). The plastic withstood the explosion perfectly except for permanent clouding and scratches from flying particles of the glass flask.

Figure 7. Five grams of explosive were used against the same piece of acrylic resin plastic. Still there was no cracking, but the sheet bent vertically and pulled out of the sheet metal guide.

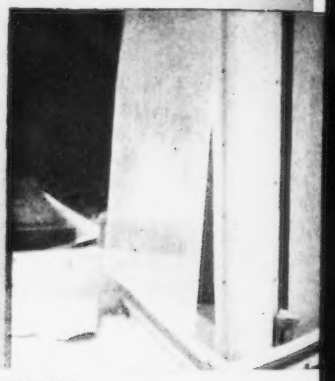


FIGURE 7

The conclusions drawn from these tests of protective glass for use in a chemical exhaust hood:

1. That wire glass is unsatisfactory. Furthermore, when wire glass cracks, it allows corrosive action on the exposed wire foundation, which weakens it further.

2. That acrylic resin plastic is the strongest of materials tested but the plastic becomes cloudy upon exposure to heat and, for that reason, is not recommended in this type of installation. However, for individually designed shields, it is recommended above other types because of its resistance to impact and because it is easily fabricated without framework.

3. That ¼ inch laminated safety glass be specified in all new general purpose chemical exhaust hoods (the use for which these tests were made) because it will withstand the most impact, produces the least flying glass and is the cheapest.

4. That ¼ inch tempered glass not be used as protection for any experimental work where sharp objects are likely to strike the glass with force. This glass is ideal for store fronts and such uses because it will withstand a large impact applied with a rounded object such as a baseball bat or person falling against it. It is more expensive than laminated glass and must be used in sizes as received from the supplier; tempered glass cannot be cut into smaller pieces.

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FIGURE 2

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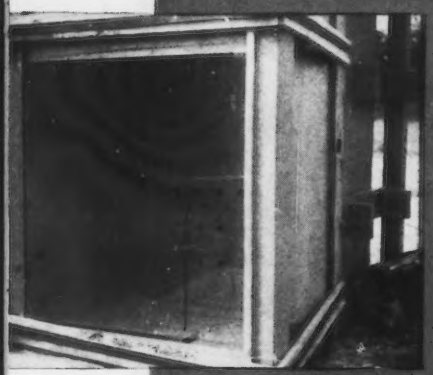

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Abstracts SAFETY AND RELATED FIELDS

All abstracts being published in the *Journal* are supplied by Engineering Index Inc., Engineering Societies Library, 29 W. 39th St., New York 18, N.Y. Because of space limitations, comparatively few of the abstracts from this service can be published in each *Journal* issue. However, subscriptions to the service are available from Engineering Index Inc., which will send, on request, a free 16 page catalog describing the service. For a nominal charge, Index subscribers may obtain copies of any of the articles which have been abstracted and, also, English translations of those published in foreign languages.

ACCIDENT PREVENTION

Analysis of Fatal Accidents in Electric Light and Power Industry in 1958, S. H. Young. *Bulletin of the Edison Electric Institute,* XXVII, No. 7 (July-August, 1959), pp. 275-80. Review and classification of 86 fatal accidents reported during 1958 within the electric light and power industry, compiled by EEI's Accident Prevention Committee from detailed report submitted to the institute; 65 of reported accidents were electric shock and burn cases.

Beware Process Explosion Hazards, R. B. Jacobs, F. H. Blunk, F. W. Scheineman. *Petroleum Refiner,* XXXVIII, No. 9 (September, 1959), pp. 361, 363-4, 367, 369-70, 372, 374. Method of determining explosive situation in plant and damage which may be caused by explosion.

Chemical Process Safety, G. L. Gorbell. American Society of Mechanical Engineers, Paper No. 59-SA-21, for meeting June 14-18, 1959, 4 pp. Chemical process safety as it relates to conditions which sometimes cause serious, and often spectacular, accidents which give the chemical industry undeserved "bad" name; measures to control and eliminate these undesirable conditions.

Color Coding Dies for Safety, W. J. Kirsch. *Tooling and Production,* XXV, No. 7 (October, 1959), pp. 58, 60. At Standard Control Div., Westinghouse Electric Corp., Beaver, Pa., where 140 presses and 6,000 dies are involved in 50,000 die setups per year, effective program for color coding dies was developed which specifies control to be used during operation of each punch press; outline of four general control methods for punch press guarding.

Do-It-Yourself Guarding, A. J. Cobb. *Saftey Maintenance,* CXVIII, No. 3 (September, 1959), pp. 10-12. Homemade guards for machinery, fabricated of wood, metal and plastics, designed and used in machine shop of Eastman Kodak Co.

How To Apply Safety to Portable Grinding, D. S. Linton, R. Allchin. *Grinding and Finishing,* V, No. 6 (October, 1959), pp. 46-49. Protective measures for handling of wheels; mountings and flanges; wheel guards; operating safety; maximum operating speed for any mounted point of given shape and size, mandrel size and overhang.

How To Maintain Conductive Floors, J. L. Brenn. *Safety Maintenance,* CXVIII, No. 5 (November, 1959), pp. 17-18. Precautions that can be taken to reduce amount of generated static electricity; use of conductive floor as common ground for grounding strips from metal fixtures and equipment, to equalize electrostatic potential throughout work area; results of tests which showed that only wax and cleaner of electroconductive type should be used in order to maintain floor conductivity.

How To Prevent Maintenance Accidents, W. C. Cooley. *Safety Maintenance,* CXVIII, No. 5 (November, 1959), pp. 12-14. Types of industrial maintenance hazards; program at Missile Systems Div., Lockheed Aircraft Corp., Calif., for safer maintenance, which includes safety training, proper safety equipment and constant supervision; list of safety devices compiled by chief safety engineer of company, applicable to most maintenance operations.

Principles of Machine Guarding. *Safety Maintenance,* CXVIII, No. 4 (October, 1959), pp. 26-31. Discussion of basic hazardous mechanical actions, with typical illustrations of each; chart gives guarding methods, actions and limitations for enclosure, interlocking, au-

tomatic and remote control, placement, feeding and ejecting guards.

Protection of Flammable Liquids. *Safety Maintenance,* CXVIII, No. 3 (September, 1959), pp. 42-43. Rules to minimize fire and other safety hazards of flammable liquids.

Sight Saving in Small Plant, W. L. Roberts. *Safety Maintenance,* CXVIII, No. 5 (November, 1959), pp. 7-9, 14. Outline of program geared to help small plants which do not have equipment or professional personnel for full time vision clinic; as result of study by New York State Optometric Assn., New York State Vision Services Inc. was formed; voluntary nonprofit organization, it sets up administrative machinery through which industrial concerns may contract for services of panel members at predetermined costs and established standards of service.

Unfallschutz bei Glueh- und Schmelzoefen, H. Zepernick. *Metall,* XIII, No. 9 (September, 1959), pp. 850-54. Prevention of accidents with annealing and melting furnaces; description of accidents in operation and of measures taken to prevent recurrence.

Welding Safety "Why's." *Welding Engineer,* XLIV, No. 12 (December, 1959), pp. 29-32. Discussion of following main hazards to which welder usually is exposed: electric shock and burns; radiant energy, and gases, fumes and dust; safety devices, precautions and treatments considered.

INDUSTRIAL HYGIENE

First Aid for Chemical Injuries, J. E. Traynor. *Safety Maintenance,* CXVIII, No. 4 (October, 1959), pp. 34-36, 42-43. Most effective treatment for chemical contamination is water; emergency eye wash fountains discussed include pedestal mounted, wall mounted stainless steel and portable types; drench showers, either multiple nozzle or single head type, may be equipped with eye wash facilities.

Lateral Approach to Tank Ventilation, G. E. Wallin. *Air Engineering,* I, No. 3 (June, 1959), pp. 19-21, 52. Factors governing hood design and fume removal processes are: determining maximum solution temperature and its quality, width and length of net surface, and type of manifold; fume and vapor control from open tank is obtained by proper control velocity for temperature and quality of solution in tank; exhaust rate considerations; "push-pull" system design; data on sizing of exhaust fans.

Techniques for Control of Beryllium Dust, W. B. Harris, A. J. Breslin, M. Eisenbud. *Air Engineering,* I, No. 5 (August, 1959), pp. 40-42; No. 6 (September, 1959), pp. 41-43; No. 7 (October, 1959), pp. 47-49. Collection and control techniques to determine Beryllium dust concentration in atmosphere surrounding Brush Beryllium Co. plant at Lorain, Ohio, which lead to establishment of outplant maximum allowable concentration; problems and remedial methods used in plant dust control and ventilation test procedures; calculation of maximum allowable concentratior

NOISE CONTROL

Foundry Noise Manual. American Foundrymen's Society; 1958; 50 pp. Compensation aspects of loss of hearing; physics of noise; physiological aspects of hearing and hearing loss; medical supervision of workers exposed to noise; measurement of noise; foundry exposures to noise; engineering control of noise; personal protective equipment (ear protectors).

Industrial Noise Manual. American Industrial Hygiene Association, Detroit, Mich.; April, 1958; 184 pp. ($7.50). Information on physical characteristics of noise, its measurement, its effect on exposed persons and its control.

Statistical Measurement of Factory Noise, G. G. Sacerdote. *Noise Control,* V, No. 6 (November, 1959), pp. 29-31, 53. Noise in factory or other noisy place specified in simple way by giving distribution of three different sound levels; statistics of noise in typewriter factory studied by use of 14 channel computer, and information used to develop simple distribution recording instrument which, in conjunction with sound level meter, gives percentages of time sound level exceeds three preselected values.

NUCLEAR SAFETY

Bases for Establishing Nuclear Safety Criteria, N. Ketzlach. Fifth Nuclear Engineering and Science Conference, Cleveland, 1959; Preprint No. 35; 10 pp. (Published by Engineers Joint Council, New York City.) Method of analysis that may be used to determine nuclear safety of arrays based on mass limitations, mass per unit area limitations for single infinite plane arrays and mass per unit length for arrays in form of cylinders (tube bundles of fuel elements).

Properties of Nuclear Shielding Concrete, J. O. Henrie. *Journal of the American Concrete Institute,* XXXI, No. 1 (July, 1959), pp. 37-46. General shielding requirements with emphasis on fast neutron shields; concrete materials which are effective in meeting requirements; concrete mix, type and source of materials, and strength properties of shields of four similar nuclear reactors are compared; effects on concrete setting time and strength of adding boron in form of mineral colemanite and borocalcite and counter effects of calcium chloride are described.

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AMERICAN SOCIETY OF SAFETY ENGINEERS

Membership Information

THE American Society of Safety Engineers has established the following classifications of active membership.

ASSOCIATE MEMBER—To be eligible as Associate Member an applicant shall be at least twenty (20) years of age and

a. Shall have a degree in engineering from a college or university whose curriculum is accredited by the Engineers' Council for Professional Development or shall have legal registration as a professional engineer and, in addition, shall be engaged in safety engineering with at least one (1) year's experience, no time being credited to this one (1) year unless at least fifty (50) per cent of the time was devoted to safety engineering, or shall have supervision over the safety engineering function of his organization; or

b. Shall have a college degree other than that specified in "a" above and, in addition, shall be engaged in safety engineering with at least three (3) years' experience, no time being credited to this three (3) years unless at least fifty (50) per cent of the time each year was devoted to safety engineering; or

c. In lieu of a college degree, shall be engaged in safety engineering with at least five (5) years' experience, no time being credited to this five (5) years unless at least fifty (50) per cent of the time each year was devoted to safety engineering.

MEMBER—To be eligible as a Member an applicant shall be at least thirty (30) years of age, shall have the qualifications required for Associate Membership and also shall have (5) years' experience in addition to that required by and of a type defined in the subsection of the requirements for Associate Member which is applicable to him.

FELLOW—To be eligible as a Fellow, a Member shall be nominated upon the unsolicited recommendation of three (3) other Members, shall be at least forty (40) years of age, shall have been a Member for at least thirteen (13) years, and shall have been engaged in safety engineering for at least twenty (20) years, during at least five (5) years of which he shall have been in responsible charge of the safety engineering function of his organization. In addition, he shall have made an outstanding contribution to the safety engineering profession. Recommendations of candidates for the Fellow classification, along with substantiating data, shall be sent to the Secretary of the Society, who shall submit such recommendations and substantiating data to the Committee on Membership. The Committee on Membership shall report its findings to the Executive Committee for action. Fellows shall be elected by a majority vote of the Executive Committee.

AFFILIATE MEMBER—To be eligible as an Affiliate Member an applicant

a. Shall be at least twenty (20) years of age and shall be engaged in safety engineering with at least one (1) year's experience, no time being credited to this one (1) year unless at least fifty (50) per cent of the time was devoted to safety engineering; he may remain in this classification while qualifying for Associate Member or Member Classification; or

b. Not being engaged in safety engineering, shall be at least twenty-five (25) years of age and shall have pursuits, attainments in accident prevention, or practical experience, extending over a period of at least three (3) years, which shall qualify him to cooperate with members of the Society and to render service to the Society.

for additional information write to

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